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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/563,281

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Tsutomu Igaki

2005-1998A

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EXAMINER

SUMMONS, BARBARA

ART UNIT

PAPER NUMBER

2817

MAIL DATE

DELIVERY MODE

02/04/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/563,281

Applicant(s)

IGAKI ET AL.

Examiner

BARBARA SUMMONS

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006 (pre-amendment).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 1/3/06
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☒ Other: Repl. drawing sheet approved

## DETAILED ACTION

### *Drawings*

1. Figure 14 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (see e.g. the specification at page 8, lines 5-6). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

2. Claims 1, 2 and 9 are objected to because of the following informalities:

In claim 1, on line 6, to maintain consistent claim terminology "IDT" should be changed to - - interdigital transducer - -, or - - (IDT) - - could be added on line 3.

In claim 1, on lines 9-10, for clarity the Examiner suggests "the interdigital transducer electrode" be changed to - - the one or more interdigital transducer electrodes - - (see lines 6-7). This change should also be made on line 13.

In claim 1, on each of line 12, in order to provide consistent terminology and exact antecedent basis for subsequently recited features, the Examiner suggests changing "connection wirings" to - - connecting wirings - - (see the subsequent recitations on lines 14 and 15, and in dependent claim 3, the last line thereof).

In claim 2, on lines 2-3, "interdigital transducer electrode" should be - - one or more interdigital transducer electrodes - -.

Similarly, in claim 2, on the last line thereof "interdigital transducer dlectrode" should be - - one or more interdigital transducer electrodes - -.

In claim 9, on line 9 thereof, it appears that "first surface acoustic wave" should be followed by - - propagation path - -. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 9 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The last line of claim 9 recites the feature "the surface acoustic wave resonator" which lacks sufficient antecedent basis in the claim so it is unclear which of the SAW resonators that form the filter (see claim 9, lines 1-2) is being referred to at the last line.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 4, and 8-10 are rejected under 35 U.S.C. § 102(b) as being anticipated by Morimoto JP 8-265099 (cited by Applicants).

Regarding claims 1 and 2, Fig. 4 (and electrically equivalent circuit Fig. 6) of Morimoto disclose a surface acoustic wave (SAW) filter comprising: a piezoelectric substrate 15; plural numbers of interdigital transducer (IDT) electrodes 11a (i.e. of each of series resonators 11x and 11z) arranged on a surface of the piezoelectric substrate as well as on a SAW propagation path running left to right in the figure (i.e. the upper path in the figure), and reflector electrodes 11b and 11c arranged at both ends of a first electrode pattern formed including the plural IDT electrodes 11a of resonators 11x and 11z; one or more IDT electrodes 11a (i.e. of parallel resonator 11y) arranged on the piezoelectric substrate as well as on a second SAW propagation path (i.e. the lower path in the figure), and reflector electrodes 11b and 11c arranged at both ends of a second electrode pattern formed including the one or more IDT electrode 11a of the parallel resonator 11y; wherein the IDT electrodes 11a of the resonators 11x and 11z in the first/upper SAW propagation path are electrically connected in series by connecting wiring arranged between the first and second electrode patterns of the first and second SAW propagation paths, and the IDT 11a of resonator 11y on the second SAW propagation path is connected between the connecting wiring and ground terminal 17c, 17d (see e.g. section [0003], the last 5 lines thereof and section [0018] of the attached machine translation); and wherein a reflector electrode 11g of which the number of electrode fingers are fewer than the reflector electrodes arranged at both ends is provided between the IDT electrodes 11a of the first electrode pattern of the first SAW

propagation path including resonators 11x and 11z, wherein reflector 11g can have fewer than the 100 electrode fingers generally disclosed for each of the reflectors 11b, 11c and 11g (see e.g. the last two sentences of section [0017]) when a structure for increasing reflectance (see 31, 33 and 37 in Figs. 14 and 15) is used in conjunction with the reflector, thereby reducing the number of reflector fingers required by shared reflector 11g and further miniaturizing the device (see section [0040]). Additionally, in view of the alternative language of the claim, one could also say that for the reflector 11g lacking an increased reflectance structure and fewer electrode fingers, that the recited reflector "is not provided" (see claim 1, the third from last line thereof).

Regarding claims 4, 8 and 10, while the IDT electrodes 11a of resonators 11x and 11z of the first electrode pattern of the first SAW propagation path are arranged so that the phases thereof are the same to each other thereby forming the ripple shown in Fig. 13B and discussed (see section [0033]) due to constructive interference from the reflected acoustic waves, they "can be" arranged so that the phases are reversed by merely shifting one of the IDTs a quarter wavelength or odd multiple thereof in the SAW propagation direction, or by merely altering which electrode finger (i.e. a signal or a ground connected electrode finger) is outermost in one of the IDTs where the two IDTs are adjacent, since a ground-signal or signal-ground combination is in-phase, but a signal-signal or ground-ground combination is reversed phase. Note that the non-positive claim limitation "can be" does not require that the IDTs actually are reversed in phase.

Regarding claim 9, Fig. 1 (equivalent to the pi ladder circuit of Fig. 17) of Morimoto discloses a SAW filter comprising SAW resonators, comprising: a piezoelectric substrate 15; plural IDTs 11a (i.e. of parallel resonators 11x and 11z) being in a first electrode pattern of a first SAW propagation path that is the lower path in this instance, and having reflectors 11b and 11c arranged at both ends thereof; one or more IDT 11a (i.e. of series resonator 11y) being a second electrode pattern of a second/upper SAW propagation path, and having reflectors 11b and 11c at both ends thereof; and wherein ones of terminals in the IDTs 11a of the first/lower SAW propagation path are respectively connected to ground at 17c and 17d, respectively, and the others of terminals of the IDTs 11a are connected to separate terminals 17a and 17b, respectively of the SAW resonator of the lower SAW propagation path.

7. Claims 1-4, 8, 10 and 11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Davenport U.S. 5,486,800.

Regarding claim 1, Figs. 6 and 8 of Davenport discloses a SAW filter comprising: a piezoelectric substrate 601; plural IDTs 602-608 forming a first electrode pattern in a first SAW propagation path with reflectors 620 and 626 arranged at both ends thereof; one or more IDTs 610-614 forming a second electrode pattern in a second SAW propagation path with reflectors 622 and 624 arranged at both ends thereof; wherein the IDTs 602-608 are electrically connected in series by connecting wirings being Nodes 2-4 that are formed as patterned conductive patterns (see e.g. col. 3, lines 8-11 and col. 4, lines 34-36) that are arranged between the first electrode pattern of the upper SAW

propagation path and the second electrode pattern of the lower SAW propagation path as shown in Fig. 8; wherein the IDT electrodes 610-614 on the second SAW propagation path are connected between the connecting wirings Nodes 2-4 and ground; and wherein a reflector electrode of which the number of electrode fingers are fewer than the reflector electrodes arranged at both ends "is not provided" between the IDTs 602-608 of the first electrode pattern.

Regarding claim 2, a SAW resonator is formed by the IDTs 610-614 and the reflectors 622, 624 since all of the IDTs on the upper acoustic track are tuned to have the same resonant frequency and all of the IDTs on the lower acoustic track are tuned to have the same resonant and anti resonant frequencies with the anti resonant frequency of the parallel resonators equal to the resonant frequency of the series resonators (see col. 7, lines 44-50 and col. 8, claims 9-11). Regarding claim 3, ones of terminals of each of the IDTs 610-614 on the lower/second SAW propagation path are connected to ground, and the other terminals thereof are connected to different connecting wirings being Nodes 2-4, respectively. Regarding claims 4, 8, 10 and 11, the IDTs 602-608 electrically connected in series in the first electrode pattern of the upper/first SAW propagation path can be arranged with the same phase or reversed phase (see col. 5, lines 15-20).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:



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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Morimoto JP 8-265099 (cited by Applicants) in view of JP 2002-016470 (cited by Applicants).

Morimoto discloses the invention as discussed above, except for explicitly disclosing that the shared reflector 11g between the IDTs of the first electrode pattern on the first SAW propagation path is connected to ground.

The Examiner Takes Official Notice that it would have been extremely well known in the SAW resonator filter art that reflectors of SAW resonators are typically either left floating or are grounded. The JP 2002-016470 reference that was cited by Applicants provides evidence that it would have been well known to connect such reflectors to ground.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW resonator filter of Morimoto (see

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e.g. Fig. 4) by having connected the shared reflector 11g to ground, if even necessary (i.e. the reflector 11g of Morimoto may already be grounded), because Morimoto is silent as to the specific connections of the shared reflector, thereby suggesting to one of ordinary skill that any well known connections, which one of ordinary skill in the art would have known included grounding as suggested by the exemplary teaching thereof by JP 2002-016470 (cover Fig. and abstract), would have been usable therewith, and also because grounding the shared reflector would have been a mere art recognized alternative to other reflector connections such as floating.

10. Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Morimoto JP 8-265099 (cited by Applicants) in view of Penunuri et al. U.S. 5,638,036.

Morimoto discloses the invention as discussed above, except for disclosing the series connection of the IDTs of the series resonators 11x and 11z (Fig. 4) being made via the shared reflector 11g between the IDTs 11a.

Penunuri et al. discloses that it would have been known to use a reflector 313 (see Fig. 3) to connect the IDTs 304 and 322 of series resonators 305 and 320 in a ladder filter (see also col. 6, lines 64-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW filter of Morimoto (e.g. Fig. 4) by having provided the series connection of the series resonator IDTs via the shared reflector electrode 11g because, as noted above, Morimoto is silent as to the connection of the shared reflector, thereby suggesting that any connection, such as using it to make

the electrical series connection between the IDTs of the series resonators, as explicitly suggested by the exemplary teaching thereof by Penunuri (Fig. 3 and col. 6, lines 64-67), would have been usable therewith.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bauer et al. U.S. 7,304,553 and WO 03/081773 disclose (Fig. 1) a SAW T-type ladder filter similar to Applicants' Fig. 1.

Inoue et al. U.S. 7,112,912 discloses (Fig. 2) a SAW ladder filter also similar to Applicants' Fig. 1 (see also Inoue Figs. 6, 12, 14, 18 and 20).

Thomas U.S. 6,163,236 discloses (Fig. 2) a SAW filter which utilizes a reflector 3 as an input to the filter, and uses reflectors to make electrical connections between IDTs of different resonators.

Plessky et al. U.S. 6,940,368 discloses a SAW lattice filter (see Figs. 8A-C) which also uses reflectors as input (A) and for electrical connection between IDTs T1 and T2 of different resonators.

Morita et al. JP 1-236809 discloses a SAW filter having two SAW resonators 6 and 7 (see Fig. 1) in first and second SAW propagation paths, respectively, wherein the first path has IDTs 2 and 3 connected as broadly recited in Applicants' claim 9.

Similarly Penunuri et al. U.S. 5,635,883 discloses a SAW filter (Fig. 3) where the SAW IDTs 315 and 330 are connected as broadly recited in Applicants' claim 9.

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Plesski et al. U.S. 5,682,126 discloses a SAW ladder filter with resonators sharing acoustic propagation tracks, with or without reflectors between them (see e.g. Fig. 5 vs. Figs. 1-4 and 10).

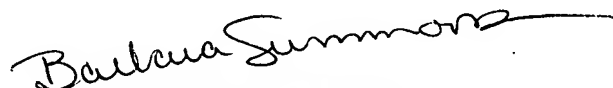
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA SUMMONS whose telephone number is (571)272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs  
January 31, 2008

(1 Attachment  
machine Translation  
of JP document  
cited by Applicants)



**BARBARA SUMMONS**  
**PRIMARY EXAMINER**